an air intake passageway having a throttle valve comprising a pivotally secured throttle plate disposed therein, said cold start apparatus comprising:

a housing fluidly coupled on one end to the air intake passageway downstream of the location of the throttle;

a cold start fuel injector having an outlet and disposed in said housing;

an idle air conduit fluidly coupled on one end to the air intake passageway, and fluidly coupled on the other end to said housing for delivering air adjacent to the outlet of said cold start fuel injector for intermixing air with fuel ejected from said cold start fuel injector; and

a [heated] heating chamber having a longitudinal lumen and disposed at the outlet of said cold start fuel injector for vaporizing the air-fuel mixture before it is delivered to the engine cylinder, wherein said heating chamber includes of a plurality of separately controlled independent heating element sections [that can be separately controlled] to vary the temperature across the heating chamber.

In claim 5, line 5, replace -- past -- with "passed".

In claim 6, lines 1 and 3, replace -- heated -- with "heating" in each instance.

In claim 7, line 1, replace -- heated -- with "heating".

In claim 8, line 1, replace -- heated -- with "heating".

In claim 9, line 4, replace -- heated -- with "heating".

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Please cancel claims 10-21; please add claims 22-48 as follows:

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~~22.~~ (New) A cold start apparatus for vaporizing fuel before it is supplied to a cylinder of a multi-cylinder internal combustion engine having a fuel supply, and an air intake passageway having a throttle valve comprising a pivotally secured throttle plate disposed in a tapered bore within the air intake passageway, said cold start apparatus comprising:

a housing fluidly coupled on one end to the air intake passageway;

a cold start fuel injector having an outlet and disposed in said housing;

an idle air conduit fluidly coupled on one end to the air intake passageway, and fluidly coupled on the other end to said housing for delivering air adjacent to the outlet of said cold start fuel injector for intermixing air with fuel ejected from said cold start fuel injector; and

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a heater chamber having a longitudinal lumen and disposed at the outlet of said cold start fuel injector for vaporizing the air-fuel mixture before it is delivered to the engine cylinder;

wherein said tapered bore in said air intake passageway further comprises at least one aperture adjacent to and downstream of the throttle plate when the throttle plate is in a closed position, and said idle air conduit being fluidly coupled through said aperture to said air intake passageway as the throttle plate is rotated open passed said aperture.

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~~23.~~ (New) A cold start apparatus according to claim ~~22~~ wherein said heater chamber further comprises a spiral depression within said lumen to effect the air-fuel mixture passing through said heater chamber to flow in a circuitously swirling fashion therethrough.

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~~24.~~ (New) A cold start apparatus according to claim ~~22~~ wherein said heater chamber further comprises a heated surface configured in the shape of a corkscrew, and disposed within said lumen to cause fluid passing through said lumen to flow in a circuitously swirling fashion therethrough.

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~~25.~~ (New) A cold start apparatus according to claim ~~22~~ further comprising an electronic control unit for controlling the operation of said cold start apparatus, said electronic control unit being responsive to at least the engine temperature and to the amount of current used by said heater chamber.

14
~~26.~~ (New) A method for reducing automobile exhaust emissions during the cold start of a multi-cylinder internal combustion engine having a fuel supply, a plurality of fuel injectors located adjacent to separate engine cylinders, a cold start fuel injector and heater, having a plurality of separately controlled independent heating element sections, fluidly coupled to the engine cylinders, and an air passageway having a

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pivotally secured throttle valve disposed therein, said method comprising the steps of:

initiating power to the heater for a period of time before the engine is started;

supplying fuel to the engine cylinders through the cold start injector;

mixing the fuel from the cold start injector with air to produce an air-fuel mixture;

passing said air-fuel mixture over said heater elements to cause the fuel to be vaporized;

supplying the vaporized air-fuel mixture to the engine cylinders when the engine is started; and

switching from fuel supplied by the cold start injector to fuel supplied by the plurality of fuel injectors after the engine reaches a pre-established threshold measured by temperature or time.

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~~27.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~26~~ 14 further comprising the step of suspending power to the heater while the engine is being cranked during engine start up.

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16 ~~28.~~ (New) A method for reducing automobile exhaust emissions according to claim 14 ~~26~~ further comprising the step of retarding the engine's spark until the engine temperature reaches about 60°C.

17 ~~29.~~ (New) A method for reducing automobile exhaust emissions according to claim 14 ~~26~~ further comprising the step of discontinuing power to the heater after switching from said cold start fuel injector to said plurality of fuel injectors.

18 ~~30.~~ (New) A method for reducing automobile exhaust emissions according to claim 14 ~~26~~, further comprising the step of cleaning deposits off the heater by momentarily spraying fuel on the heater from the cold start fuel injector.

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19 ~~31.~~ (New) A method for reducing automobile exhaust emissions according to claim 18 ~~30~~ further comprising the step of simultaneously suspending the fuel supplied from the port fuel injectors by an amount substantially equal to the fuel supplied by the cold start fuel injector.

20 ~~32.~~ (New) A method for reducing automobile exhaust emissions according to claim 14 ~~26~~ wherein said step of switching from fuel supplied by the cold start injector to fuel supplied by each of the port injectors after the engine reaches a temperature of about 60°C.

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~~33.~~ (New) A method for reducing automobile exhaust emissions according to claim 14 ~~26~~ further comprising the steps of:

measuring the amount of current used by the heater after the heater has reached a steady state temperature;

comparing the measured steady state current level to a preset threshold current level; and

triggering a malfunction indicator if the measured steady state current level is different from the threshold current level.

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~~34.~~ (New) A method for reducing automobile exhaust emissions according to claim 14 ~~26~~ further comprising the step of limiting the amount of air to be mixed with the fuel by controlling the rotational position of the throttle.

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~~35.~~ (New) A method for reducing automobile exhaust emissions according to claim 14 ~~26~~ wherein the heater contains a plurality of separate heater elements, said method further comprising the step of varying the power to the separate heater elements to effect different temperatures in the different heater elements.

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~~36.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~26~~ wherein the air-fuel mixture is passed over the heater in a circuitously swirling fashion with respect thereto.

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~~37.~~ (New) A method for reducing automobile exhaust emissions during the cold start of a multi-cylinder internal combustion engine having a fuel supply, a plurality of fuel injectors located adjacent to separate engine cylinders, a cold start fuel injector and heater fluidly coupled to the engine cylinders, and an air passageway having a pivotally secured throttle valve disposed therein, said method comprising the steps of:

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initiating power to the heater for a period of time before the engine is started;

supplying fuel through the cold start injector;

mixing the fuel from the cold start injector with air to produce an air-fuel mixture;

passing said air-fuel mixture over the heater to cause the fuel to be vaporized;

supplying the vaporized air-fuel mixture to the engine cylinders when the engine is started;

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switching from fuel supplied by the cold start injector to fuel supplied by the plurality of fuel injectors after the engine reaches a pre-established threshold measured by temperature or time;

discontinuing power to the heater; and

cleaning deposits off the heater by momentarily spraying fuel on the heater from the cold start fuel injector.

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~~38.~~ (New) A method for reducing automobile exhaust emissions according to claim 25 ~~37~~ further comprising the step of simultaneously suspending the fuel supplied from the port fuel injectors by an amount substantially equal to the fuel supplied by the cold start fuel injector during the step of cleaning deposits off the heater.

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~~39.~~ (New) A method for reducing automobile exhaust emissions according to claim 25 ~~37~~ further comprising the step of retarding the engine's spark until the engine temperature reaches about 60°C.

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~~40.~~ (New) A method for reducing automobile exhaust emissions according to claim 25 ~~37~~ further comprising the step of suspending power to the heater while the engine is being cranked during engine start up.

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~~41.~~ (New) A method for reducing automobile exhaust emissions according to claim 25 ~~37~~ wherein said step of switching from fuel supplied by the cold start injector to fuel

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supplied by each of the port injectors after the engine reaches a temperature of about 60°C.

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~~42.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~37~~ further comprising the step of limiting the amount of air to be mixed with the fuel by controlling the rotational position of the throttle.

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~~43.~~ (New) A method for reducing automobile exhaust emissions during the cold start of a multi-cylinder internal combustion engine having a fuel supply, a plurality of fuel injectors located adjacent to separate engine cylinders, a cold start fuel injector and heater fluidly coupled to the engine cylinders, and an air passageway having a pivotally secured throttle valve disposed therein, said method comprising the steps of:

initiating power to the heater for a period of time before the engine is started;

supplying fuel through the cold start injector;

mixing the fuel from the cold start injector with air to produce an air-fuel mixture;

passing said air-fuel mixture over the heater to cause the fuel to be vaporized;

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supplying the vaporized air-fuel mixture to the engine cylinders when the engine is started;

switching from fuel supplied by the cold start injector to fuel supplied by the plurality of fuel injectors after the engine reaches a pre-established threshold measured by temperature or time;

measuring the maximum amount of current used to initially power the heater;

comparing the measured maximum current to a preset threshold current level; and

triggering a malfunction indicator if the measured maximum current is different from the threshold current level.

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~~44.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~43~~ further comprising the steps of:

measuring the amount of current used by the heater after the heater has reached a steady state temperature;

comparing the measured steady state current level to a preset threshold current level; and

triggering a malfunction indicator if the measured steady state current level is different from the threshold current level.

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~~45.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~43~~ further comprising the step of suspending power to the heater while the engine is being cranked during engine start up.

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~~46.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~43~~ wherein said step of switching from fuel supplied by the cold start injector to fuel supplied by each of the port injectors after the engine reaches a temperature of about 60°C.

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~~47.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~43~~ further comprising the step of limiting the amount of air to be mixed with the fuel by controlling the rotational position of the throttle.

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~~48.~~ (New) A method for reducing automobile exhaust emissions according to claim ~~43~~ further comprising the steps of discontinuing power to the heater and cleaning deposits off the heater by momentarily spraying fuel on the heater from the cold start fuel injector.

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